

REMARKS

Prior to entry of the instant amendment, claims 1-10 are currently pending in the subject application. By the instant amendment, claims 1-7 are canceled as being directed to a non-elected group. Applicants, of course, reserve the right to file a divisional patent application to prosecute the subject matter of the non-elected claims. Further, claims 8-10 are amended to more particularly recite the subject matter of the present invention. No new matter is added by the instant amendment.

Applicants appreciate the Examiner's acknowledgement of applicants' claim for foreign priority and receipt of a certified copy of the priority document in a previous Official Action.

Claims 8-10 are presented to the Examiner for further prosecution on the merits.

A. Introduction

In the outstanding Office Action mailed October 23, 2003, the Examiner rejected claims 8-10 under 35 U.S.C. § 112, second paragraph; rejected claims 8-10 under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,960,605 to Beck et al. ("the Beck et al. reference"); and rejected claim 10 under 35 U.S.C. § 103(a) as unpatentable over the Beck et al. reference further in view of U.S. Patent No. 5,880,013 to Yang et al. ("the Yang et al. reference") or U.S. Patent No. 6,559,462 B1 to Carpenter et al. ("the Carpenter et al. reference").

B. Asserted Rejections Under 35 U.S.C. § 112, second paragraph

In the outstanding Office Action, the Examiner rejected claims 8-10 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

By the instant amendment, claim 8 has been amended to more particularly recite the subject matter of the present invention. Specifically, the expression “external pressures” has been amended to “atmospheric pressure.” The expression the “inside of the ion generator” has been amended to the “interior of the ion generator” to maintain consistency in the claim.

Regarding the “inflammable impurities,” elements that are regarded as “inflammable impurities” in the context of this invention are identified in the last sentences of paragraphs [0027] and [0036]. In general, any element whose presence in a system is undesirable at a given time is regarded as an “impurity.” After cleaning the interior of the ion generator, the ion generator is closed and the interior of the ion generator and the vacuum line is evacuated. At this stage, the presence of phosphorus, hydrogen or magnesium in the interior of the ion generator and vacuum line is undesirable as is the presence of other impurities that may be generated by, for example, a reaction with chamber walls or from damaged parts. However, it is phosphorus, hydrogen and magnesium that are considered “inflammable impurities.” Claim 10 is not intended to require the presence of all three of the listed impurities but rather any one or more of those impurities.

The usage of the expression “inert gas” in claim 9 has been corrected.

In view of the above amendments and remarks, reconsideration and withdrawal of the rejection of claims 8-10 under 35 U.S.C. § 112, second paragraph, are respectfully requested.

C. Asserted Rejection of Claims 8-10
Under 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a)

In the outstanding Office Action, the Examiner rejected claims 8-10 under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as obvious over the Beck et al. reference. This rejection is respectfully traversed.

The Examiner cites the Beck et al. reference stating:

Beck et al teach use of ion implantation systems that employs a hollow-cathode ion source, where the discharge chamber uses tungsten filaments for cathode and electron emission, where a new filament must be inserted at the end of each filaments' "life" (i.e. the generator opened to replace the used up, hence damaged, part). At the start of an ion implantation run (so at the beginning after closing following replacement) the system is connected to an argon source, which flows from the oven with the implantation material to be evaporated into the discharge chamber to result in gas pressure of 10^{-3} - 10^{-2} torr for the two chambers (possibly reading on meanings of unclear "equalize ... pressures"). As the ion source material is evaporated to increase its partial pressure to that required for maintaining the plasma discharge, the flow of Ar is cut off (another possible meaning for "equalize ..."). See the Abstract; Col. 1, lines 6-7, Col. 4, line 45-Col. 5, lines 10 and 21-34. Note while there is no discussion of oxygen and inflammable impurities, the act of flowing through Ar at the start of a process will inherently flush out and remove any residual air (contains H_2 , H_2O , etc.) and any other gases or various remaining contaminates, etc. Alternately, it would have been obvious to one of ordinary skill in the art, to flush out any chamber that requires processing under vacuum, as does that of Beck et al, in order to remove traces of atmospheric gases, and previous use residues, in order to avoid contaminating new products with undesirable materials. Also, the uncertainty of the meaning of "equalize ..." makes the 102/103 appropriate.

Office Action of Oct. 23, 2003 at pp. 3-4.

The Beck et al. reference differs from the present invention as presently recited in claim 8 in at least one patentably distinct way. Specifically, the Beck et al. reference does not teach nor suggest injecting an inert gas into an interior of the ion generator and the vacuum line before evacuation of the interior of ion generator and the vacuum line (see column 4, line 45 – column 5, line 11). In the Beck et al. reference, as stated in column 5, lines 1-10, argon flows through the oven into the discharge chamber before ion-implantation (which does not mean before a roughing step of evacuation, because ion-implantation is performed after evacuation) to maintain gas pressure at a predetermined range before igniting the gas discharge. More particularly, the

Beck et al. reference does not disclose or suggest injecting an inert gas into the vacuum line at any stage of operation, as presently recited in claim 8.

By way of background, the present invention deals with flushing an interior of an ion generator and a vacuum line of a vacuum apparatus in an ion-implantation system with an inert gas, after opening the ion generator to clean the interior thereof or to replace a damaged part, but before evacuating the ion generator. This flushing is performed because during roughing pump operation of the vacuum apparatus, an explosion may be caused by a reaction between rapidly flowing oxygen through the vacuum line, which entered the ion generator when the ion generator was opened for cleaning or part replacement, with inflammable impurities, which were deposited in the vacuum line during regular operation. Flushing the interior of the ion generator and vacuum line, before operating the vacuum apparatus, rapidly removes oxygen from the interior of the ion generator and the vacuum line, so that an explosion may be prevented in the vacuum line during evacuation.

As indicated above, the Beck et al. reference does not teach nor suggest injecting an inert gas into an interior of the ion generator and the vacuum line before evacuation of the interior of the ion generator and the vacuum line as recited in claim 8 of the present invention. Accordingly, reconsideration and withdrawal of the rejections of claims 8-10 are respectfully requested.

Cumulative References

In the outstanding Office Action, the Examiner cites two references as being merely cumulative to the above rejection, viz., U.S. Patent No. 6,291,939 to Nishida ("the Nishida reference") and U.S. Patent No. 6,464,891 to Druz et al. ("the Druz et al. reference"). The Examiner asserts that these references teach "reasons for flushing ion generating system with

non-reactive (inert, Ar gases or purge gases) in order to remove or exclude water and O₂.” *Office Action of Oct. 23, 2003, at p. 4*. Neither reference, however, discloses injecting an inert gas into the vacuum line before evacuation, which is presently recited in claim 8.

Accordingly, neither reference renders the subject matter of the present invention, as presently recited in claim 8, unpatentable.

D. Asserted Rejection of Claim 10 Under 35 U.S.C. § 103(a)

In the outstanding Office Action, the Examiner rejected claim 10 under 35 U.S.C. § 103(a) as unpatentable over the Beck et al. reference, further in view of the Yang et al. reference or the Carpenter et al. reference. This rejection is respectfully traversed.

As claim 10 is dependent on claim 8, which is believed to be allowable, it is respectfully submitted that claim 10 is similarly allowable as being dependent on an allowable base claim.

Accordingly, reconsideration and withdrawal of the rejection of claim 10 are respectfully requested.

Other Art of Interest

In the outstanding Office Action, the Examiner cited two (2) additional references are being “other art of interest.” Specifically, the Examiner cited U.S. Patent No. 6,435,196 to Satoh et al. (“the Satoh et al. reference”) and U.S. Patent No. 4,697,085 to Magee et al. (“the Magee et al. reference”). It is respectfully submitted that neither of these references discloses or suggests injecting an inert gas into the interior of an ion generator or vacuum line before evacuation, as recited in claim 8.

E. Conclusion

Since none of the cited prior art references, taken alone or in combination, either anticipates or renders obvious claims 8-10 of the subject application, it is respectfully submitted that claims 8-10 are in condition for allowance, and a notice to such effect is respectfully requested.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all pending claims is hereby requested.

Respectfully submitted,

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DEPOSIT ACCOUNT CHARGE AUTHORIZATION

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